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Building & Highway Material Testing Laboratory
An ISO 9001:2008 Certified Company
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Job No.: CTCE/BBMP/KRIDL/W.No.03/DBM/Stability/2017-18 28.04.2017

TEST REPORT ON MARSHALL STABILITY OF MIX

* Customer	:	**Asst. Executive Engineer,** Yelahanka Satellite Sub Division, BBMP, Bangalore.
* Agency	:	**Technical Manager (West),** KRIDL, Bangalore.
* Name of the Work	:	Improvements to Roads and Drains in Attur Village Govt. School road, Post office road of Attur Ward No.03, BBMP, Bangalore.
* PMC Reference	:	BBMP/EE(YNK.D)/W.O/144/2016-17 Dated: 31.03.2017
Source / location	:	Hot mix Plant, Bangalore
* Type of Mix	:	Dense Graded Bituminous Macadam
Date of Testing	:	28.04.2017

The results of the tests conducted on the Dense Graded Bituminous Macadam sample are as follows:

Sl. No	Description	Test Result 1	Test Result 2	Requirement as per MORTH (Table 500-11)
1	Marshall Stability, Kn	9.15	9.35	9 Kn (min)
2	Marshall flow, mm	2.20	2.60	2 – 4
3	Percent air voids in Mineral Aggregate	3.15	3.95	3 – 6
4	Voids in Compacted Mix	11.95	12.30	11 – 13
5	Percent Voids filled with Bitumen	66.85	67.90	65 - 75
6	Density, g/cc	2.26	2.27	--

* Information is furnished by the Customer/Representative

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Note:

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Job No.: CTCE/BBMP/KRIDL/W.No.03/CSR-04/310g/QB(BC)/2017-18 27.04.2017

TEST REPORT ON DETERMINATION OF BITUMEN CHARACTERISTICS

* Customer	:	**Asst. Executive Engineer,** Yelahanka Satellite Sub Division, BBMP, Bangalore.
* Agency	:	**Technical Manager (West),** KRIDL, Bangalore.
* Name of work	:	Improvements to Roads and Drains in Attur Village Govt. School road, Post office road of Attur Ward No.03, BBMP, Bangalore.
* PMC Reference	:	BBMP/EE(YNK.D)/W.O/144/2016-17 Dated: 31.03.2017
* Sample ID	:	Bitumen
Source/ Location	:	Hot Mix Plant, Bangalore.
Sample Received on	:	25.04.2017
Period of Testing	:	27.04.2017

The results of the tests conducted on the bitumen sample are as follows:

Sl. No	Description	Test Method as per IS	Test Result	Requirement as per IS:73:2013
1	Penetration at 25 ^{0}C, 1/10 mm	IS :1203 -1978 (RA-2014)	86	80 to 100
2	Softening point, ^{0}C	IS :1205 -1978 (RA-2014)	43	Min. 40
3	Ductility at 27^{0}C, cm	IS :1208 -1978 (RA-2014)	100 >	Min. 75
4	Flash Point, ^{0}C	IS :1209 -1978 (RA-2014)	308	Min. 220

* Information is furnished by the Customer/Representative

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AE-03

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Technical Manager

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Job No.: CTCE/BBMP/KRIDL/W.No.03/BC/AIV/2017-18

27.04.2017

TEST REPORT ON IMPACT VALUE OF AGGREGATES

* Customer	:	**Asst. Executive Engineer,** Yelahanka Satellite Sub Division, BBMP, Bangalore.
* Agency	:	**Technical Manager (West),** KRIDL, Bangalore.
* Name of Work	:	Improvements to Roads and Drains in Attur Village Govt. School road, Post office road of Attur Ward No.03, BBMP, Bangalore.
* Reference	:	BBMP/EE(YNK.D)/W.O/144/2016-17 Dated: 31.03.2017
* Sample ID	:	Hot mix plant, Bangalore.
* Type of Mix	:	Bituminous Concrete
Technical Reference	:	IS: 2386 (Part- 4)-1963 (RA-2011)
Date of Testing	:	27.04.2017

Sl No.	Details	Trial No.		Average
		1	2	
1	Total weight of aggregate sample filling the cylindrical measure = W_1 g	388	389	
2	Weight of agregate passing 2.36 mm sieve after the test = W_2 g	85	86	
3	Weight of aggregate retained 2.36 mm sieve after the test = W_3 g	303	303	
4	Aggregate Impact value = percent fines 100* (W2/W1) percent	21.91	22.11	22.01

*Information is furnished by the Customer/Representative.

Comments:

→ Maximum allowable Aggregate Impact value for Bituminous Concrete is 24%

Note:

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Job No.: CTCE/BBMP/KRIDL/W.No.03/BC/Shape.T/2017-18

27.04.2017

TEST REPORT ON FLAKINESS INDEX & ELONGATION INDEX OF COARSE AGGREGATES

* Customer	:	**Asst. Executive Engineer,** Yelahanka Satellite Sub Division, BBMP, Bangalore.
* Agency	:	**Technical Manager (West),** KRIDL, Bangalore.
* Name of Work	:	Improvements to Roads and Drains in Attur Village Govt. School road, Post office road of Attur Ward No.03, BBMP, Bangalore.
* Reference	:	BBMP/EE(YNK.D)/W.O/144/2016-17 Dated: 31.03.2017
* Sample ID	:	Hot mix plant, Bangalore
Technical Reference	:	IS : 2386(Part -1)-1963 (RA-2011)
* Type of Mix	:	Bituminous Concrete
Date of Testing	:	27.04.2017

Sl.No.	Description	Result
1	Flakiness Index	12.92%
2	Elongation Index	13.28%
3	Combined Flakiness & Elongation Index	26.20%

*Information is furnished by the Customer/Representative.

Comments:

→ Maximum allowable Flakiness & Elongation Index for Bituminous Concrete is 30%

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Job No.: CTCE/BBMP/KRIDL/W.No.03/BC/Stripping/2017-18 28.04.2017

TEST REPORT ON STRIPPING VALUEOF ROAD AGGREGATES (STATIC IMMERSION TEST)

* Customer	:	**Asst. Executive Engineer,** Yelahanka Satellite Sub Division, BBMP, Bangalore.
* Agency	:	**Technical Manager (West),** KRIDL, Bangalore.
* Name of Work	:	Improvements to Roads and Drains in Attur Village Govt. School road, Post office road of Attur Ward No.03, BBMP, Bangalore.
* Reference	:	BBMP/EE(YNK.D)/W.O/144/2016-17 Dated: 31.03.2017
Technical Reference	:	IS: 6241
* Type of Mix	:	Bituminous Concrete
Date of Testing	:	28.04.2017

Type of binder : 80/100
Percentage of binder used : 5.00% by wt.
Total weight of aggregate : 200 g
Total weight of binder : 10.00 g
Temperature of water-bath : 40° C

Observation Number	Stripping, Percentage	Average, Percentage	Average Retained Coating, %
1	3.2	3.30	96.70
2	3.3		
3	3.4		

*Information is furnished by the Customer/Representative.

Comments:

→ Minimum allowable Aggregate retained coating for Bituminous Concrete is 95%

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Job No.: CTCE/BBMP/KRIDL/W.No.03/BC/Sp_Wa/2017-18

28.04.2017

TEST REEPORT ON SPECIFIC GRAVITY AND WATER ABSORPTION

* Customer	:	Asst. Executive Engineer, Yelahanka Satellite Sub Division, BBMP, Bangalore.
* Agency	:	Technical Manager (West), KRIDL, Bangalore.
* Name of Work	:	Improvements to Roads and Drains in Attur Village Govt. School road, Post office road of Attur Ward No.03, BBMP, Bangalore.
* Reference	:	BBMP/EE(YNK.D)/W.O/144/2016-17 Dated: 31.03.2017
* Sample ID	:	Hot mix plant, Bangalore
Technical Reference	:	IS : 2386(Part -3)-1963 (RA-2011)
* Type of Mix	:	Bituminous Concrete
Date of Testing	:	28.04.2017

Sl. No.	Details	Notation	Test Number			Mean Value
			Test 1	Test 2	Test 3	
1	Weight of aggregate suspended in water with the basket	W_1 g	2001	2002	2003	
2	Weight of basket suspended in water	W_2 g	755	755	755	
3	Weight of saturated aggregate in water	$(W_1 - W_2) = W_s$ g	1239	1238	1248	
4	Weight of saturated surface dry aggregate in air	W_3 g	2005	2006	2004	
5	Weight of water equal to the volume of the aggregate	$(W_3 - W_S)$ g	766	768	756	
6	Weight of oven dried aggregate	W_4 g	1999	1995	1996	
7	Specific Gravity	$W_4/(W_3-W_S)$	2.610	2.598	2.640	2.616
8	Apparent Specific gravity	$W_4/(W_4-W_S)$	2.630	2.635	2.668	2.645
9	Water Absorption	$((W_3-W_4)*100)/W_4$	0.30%	0.55%	0.40%	0.42%

*Information is furnished by the Customer/Representative.

Comments:

→ Maximum allowable Aggregate Water absorption value for Bituminous Concrete is 2.0%

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Job No: CTCE/BBMP/KRIDL/W.No.03/BC/Bitumen/2017-18

28.04.2017

TEST REPORT ON BITUMEN CONTENT OF BITUMINOUS CONCRETE MIX

* Customer	:	Asst. Executive Engineer, Yelahanka Satellite Sub Division, BBMP, Bangalore.
* Agency	:	Technical Manager (West), KRIDL, Bangalore.
* Name of Work	:	Improvements to Roads and Drains in Attur Village Govt. School road, Post office road of Attur Ward No.03, BBMP, Bangalore.
* Reference	:	BBMP/EE(YNK.D)/W.O/144/2016-17 Dated: 31.03.2017
* Sample ID	:	Attur Main Road Ward No.03.
Technical Reference	:	IRC:SP:11-1984
Date of Testing	:	28.04.2017

BITUMEN CONTENT DETERMINATION

Description	Trail 1	Trail 2
1. Weight of Mixture before Test, g	500	500
2. Weight of Mixture after Test, g	474	473.5
3. Weight of Asphalt and Mineral matter Extracted, g	-	-
4. Weight of Mineral Matter, g.	-	-
5. Weight of Ash, g		
6. Weight of Bitumen Extracted, g. (corrected)	26	26.50
7. Bitumen content in %	5.20	5.30
8. Average	5.25	

*Information is furnished by the Customer/Representative.

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Job No: CTCE/BBMP/KRIDL/W.No.02/BC/Bitumen/2017-18

28.04.2017

TEST REPORT ON BITUMEN CONTENT AFTER GRADATION DETERMINATION OF BITUMINOUS CONCRETE MIX

* Customer	:	Asst. Executive Engineer, Yelahanka Satellite Sub Division, BBMP, Bangalore.
* Agency	:	Technical Manager (West), KRIDL, Bangalore.
* Name of Work	:	Improvements to Roads and Drains in Attur Village Govt. School road, Post office road of Attur Ward No.03, BBMP, Bangalore.
* Reference	:	BBMP/EE(YNK.D)/W.O/144/2016-17 Dated: 31.03.2017
* Sample ID	:	Attur Main Road Ward No.03.
Technical Reference	:	IS 2386 and IRC:SP:11-1984
Date of Testing	:	28.04.2017

GRADATION AFTER EXTRACTION

Sieve Size in mm	Trail 1				Specified Limits as per MORTH specification table 500-18 (Grading-2)
	Weight Retained, gm	% Retained	%Cummulative Retained	% Passing	
19	0	0	0	100	100
13.2	44.65	9.42	9.42	90.58	79-100
9.5	33.13	6.99	16.41	83.59	70-88
4.75	73.15	15.43	31.84	68.16	53-71
2.36	67.25	14.19	46.03	53.97	42-58
1.18	52.65	11.11	57.14	42.86	34-48
0.6	57.36	12.10	69.24	30.76	26-38
0.3	46.36	9.78	79.02	20.98	18-28
0.15	32.26	6.81	85.82	14.18	12-20
0.075	31.25	6.59	92.42	7.58	4-10

Sieve Size in mm	Trail 2				Specified Limits as per MORTH specification table 500-18 (Grading-2)
	Weight Retained, gm	% Retained	%Cummulative Retained	% Passing	
19	0	0	0	100	100
13.2	34.26	7.24	7.24	92.76	79-100
9.5	45.25	9.56	16.79	83.21	70-88
4.75	69.32	14.64	31.43	68.57	53-71
2.36	72.25	15.26	46.69	53.31	42-58
1.18	63.23	13.35	60.04	39.96	34-48
0.6	53.16	11.23	71.27	28.73	26-38
0.3	36.66	7.74	79.01	20.99	18-28
0.15	27.25	5.76	84.77	15.23	12-20
0.075	39.23	8.29	93.05	6.95	4-10

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Job No.: CTCE/BBMP/KRIDL/W.No.03/BC/Agg/2017-18

TEST REPORT ON GRADATION OF AGGREGATE

28.04.2017

* Customer	:	Asst. Executive Engineer, Yelahanka Satellite Sub Division, BBMP, Bangalore.
* Agency	:	Technical Manager (West), KRIDL, Bangalore.
* Name of Work	:	Improvements to Roads and Drains in Attur Village Govt. School road, Post office road of Attur Ward No.03, BBMP, Bangalore.
* Reference	:	BBMP/EE(YNK.D)/W.O/144/2016-17 Dated: 31.03.2017
* Sample ID	:	Bituminous Concrete
Technical Reference	:	IS : 2386(Part -1)-1963 (RA-2011)
* Type of Mix	:	Hot mix plant, Bangalore
Date of Testing	:	28.04.2017

Total Weight of Sample: **5300** gm

Sieve Size, mm	Weight Retained, gm	% Retained	Cummulative % Retained	% Passing	JOBMIX Gradation as per MORTH	Remarks
19	0	0	0	100	100	Gradation satisfies Bituminous concrete Grade-II specification as per `MORTH 500-18
13.2	745	14.06	14.06	85.94	79 - 100	
9.5	535	10.09	24.15	75.85	70 - 88	
4.75	625	11.79	35.94	64.06	53 - 71	
2.36	535	10.09	46.04	53.96	42 - 58	
1.18	530	10.00	56.04	43.96	34 - 48	
0.600	550	10.38	66.42	33.58	26 - 38	
0.300	590	11.13	77.55	22.45	18 - 28	
0.150	385	7.26	84.81	15.19	12 - 20	
0.075	415	7.83	92.64	7.36	4 - 10	

Total Weight of Sample: **5350** gm

Sieve Size, mm	Weight Retained, gm	% Retained	Cummulative % Retained	% Passing	JOBMIX Gradation as per MORTH	Remarks
19	0	0	0	100	100	Gradation satisfies Bituminous concrete Grade-II specification as per MORTH 500-18
13.2	630	11.78	11.78	88.22	79 - 100	
9.5	630	11.78	23.55	76.45	70 - 88	
4.75	625	11.68	35.23	64.77	53 - 71	
2.36	580	10.84	46.07	53.93	42 - 58	
1.18	625	11.68	57.76	42.24	34 - 48	
0.600	530	9.91	67.66	32.34	26 - 38	
0.300	590	11.03	78.69	21.31	18 - 28	
0.150	385	7.20	85.89	14.11	12 - 20	
0.075	445	8.32	94.21	5.79	4 - 10	

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Job No.: CTCE/BBMP/KRIDL/W.No.03/BC/Stability/2017-18 28.04.2017

TEST REPORT ON MARSHALL STABILITY OF MIX

* Customer	:	**Asst. Executive Engineer,** Yelahanka Satellite Sub Division, BBMP, Bangalore.
* Agency	:	**Technical Manager (West),** KRIDL, Bangalore.
*Name of the Work	:	Improvements to Roads and Drains in Attur Village Govt. School road, Post office road of Attur Ward No.03, BBMP, Bangalore.
*Reference	:	BBMP/EE(YNK.D)/W.O/144/2016-17 Dated: 31.03.2017
* Source	:	Hot mix Plant, Bangalore
* Type of Mix	:	Bituminous Concrete
Date of Testing	:	28.04.2017

The results of the tests conducted on the Bituminous Concrete mix sample are as follows:

Sl. No	Description	Test Result 1	Test Result 2	Requirement as per MORTH (Table 500-19)
1	Marshall Stability, Kn	9.30	9.65	9 Kn (min)
2	Marshall flow, mm	2.25	3.30	2 – 4
3	Percent air voids in Mineral Aggregate	3.15	4.05	3 – 6
4	Voids in Compacted Mix	13.25	13.95	13 - 15
5	Percent Voids filled with Bitumen	66.25	67.30	65 - 75
6	Density, g/cc	2.27	2.28	--

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